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ORIGINAL PAPER

HIV Viral Suppression, 37 States and the District of Columbia, 2014

Kristen L. Hess[1] · **H. Irene Hall**[1]

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Abstract Achieving viral suppression among HIV-positive persons is a critical component of HIV treatment and prevention, because it leads to improved health outcomes for the individual and reduced risk of HIV transmission. There is wide variation in viral suppression across jurisdictions, races/ethnicities, age groups, and transmission risk groups. This analysis uses HIV surveillance data to examine rates of viral suppression among people living with diagnosed HIV (PLWDH) in 38 jurisdictions with complete lab reporting. Among people who received a diagnosis in 2014, the percentage with viral suppression within 12 months of diagnosis and the average time to viral suppression was assessed. Overall, among PLWDH in 2014, 57.9% were virally suppressed, and, among people with HIV diagnosed in 2014, 68.2% were suppressed within 12 months of diagnosis with an average time to suppression of 6.9 months. All outcomes varied by jurisdiction, but most had similar patterns of disparities with a few exceptions. These data highlight the need for tailored interventions at the local level. In addition, jurisdictions with relatively low viral suppression among particular groups could adapt effective interventions from jurisdictions who have higher rates of suppression.

Keywords HIV · Viral suppression · Health disparities · Race/ethnicity

Introduction

A critical component of HIV treatment and prevention programs is viral suppression among HIV-positive persons. Viral suppression not only leads to improved health outcomes for the individual, but can also reduce the risk of HIV transmission [1, 2]. Given the importance of viral suppression, increasing the percentage of persons living with diagnosed HIV (PLWDH) who are virally suppressed to 80% has been set as a national goal in the United States [3]. Among PLWDH at year-end 2014 in the United States, only 57.9% were virally suppressed, and this varied by race/ethnicity, age, transmission category, and state [4]. For example, among black/African American (hereafter referred to as black) PLWDH, 51.5% were virally suppressed compared to 65.0% of white PLWDH. Among the 38 jurisdictions included in the report, the percentage virally suppressed ranged from a low of 34.3% in Virginia to a high of 78.8% in Montana. These disparities suggest a need for local interventions tailored to the population segments most in need to eliminate the disparities and achieve the national goal. To aid in this process, this analysis uses national HIV surveillance data to examine disparities at the jurisdiction level to reveal variations in the profile of disparities that may be masked at the national level.

Methods

Data from the National HIV Surveillance System (NHSS) reported to CDC through December 2016 were used to determine the number of persons living with diagnosed HIV and the percentage of persons who were virally suppressed during 2014. We also determined the percentage of persons who received a diagnosis during 2014 who were

✉ Kristen L. Hess
xgm0@cdc.gov

[1] Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, 1600 Clifton Rd, MS-E47, Atlanta, GA 30329, USA

Table 1 Viral Suppression among persons living with HIV, by Jurisdiction and Race/Ethnicity, 38 U.S. Jurisdictions, 2014

Jurisdiction	Persons living with diagnosed HIV (PLWDH)												Persons living with HIV (PLWH)	
	Black/African American			Hispanic/Latino[a]			White			Total			PLWH[b]	Viral suppression
	PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression			
	N	N	%	N	N	%	N	N	%	N	N	%	N	%
Alabama	7463	3963	53.1	348	174	50.0	3315	2046	61.7	11,759	6577	55.9	14,700	44.7
Alaska	73	42	57.5	59	41	69.5	271	194	71.6	593	426	71.8	—	
California	19,911	10,838	54.4	39,556	23,608	59.7	46,725	32,353	69.2	113,883	71,936	63.2	139,900	51.4
Colorado	1511	682	45.1	2237	1111	49.7	6547	3218	49.2	10,705	5216	48.7	12,800	40.8
Connecticut	3239	2149	66.4	3349	2202	65.8	3051	2246	73.6	9926	6,812	68.6	11,300	60.3
Delaware	1816	1072	59.0	241	128	53.1	916	601	65.6	3088	1870	60.6	3700	50.5
District of Columbia	10,523	5265	50.0	1051	559	53.2	2438	1391	57.1	14,574	7526	51.6	18,200	41.4
Georgia	30,677	15,499	50.5	2923	1531	52.4	9008	5585	62.0	44,967	24,120	53.6	55,700	43.3
Hawaii	134	67	50.0	298	165	55.4	1350	816	60.4	2626	1574	59.9	—	
Illinois	15,453	6784	43.9	6097	3157	51.8	9485	5402	57.0	33,271	16,756	50.4	40,200	41.7
Indiana	3486	1811	52.0	858	424	49.4	4940	3151	63.8	9771	5683	58.2	12,200	46.6
Iowa	423	264	62.4	211	124	58.8	1478	1158	78.3	2264	1659	73.3	—	
Louisiana	12,033	6354	52.8	816	338	41.4	4468	2967	66.4	17,717	9891	55.8	23,300	42.5
Maine	158	104	65.8	91	65	71.4	1080	805	74.5	1377	1011	73.4	—	
Maryland	22,760	9818	43.1	1740	854	49.1	4231	1980	46.8	30,598	13,620	44.5	37,200	36.6
Massachusetts	5379	3458	64.3	4897	3068	62.7	7724	5687	73.6	18,714	12,712	67.9	22,400	56.8
Michigan	7875	4291	54.5	786	467	59.4	4802	3,310	68.9	14,063	8454	60.1	18,200	46.5
Minnesota	2478	1440	58.1	697	399	57.2	3591	2639	73.5	7240	4806	66.4	8900	54.0
Mississippi	6138	2547	41.5	268	115	42.9	1689	774	45.8	8499	3659	43.1	10,300	35.5
Missouri	4785	2816	58.9	582	337	57.9	5318	3653	68.7	11,061	7057	63.8	13,400	52.7
Montana	16	13	81.3	25	17	68.0	430	345	80.2	529	417	78.8	—	
Nebraska	521	241	46.3	283	129	45.6	983	586	59.6	1882	1004	53.4	—	
New Hampshire	133	78	58.6	157	109	69.4	837	616	73.6	1176	840	71.4	—	
New Mexico	180	103	57.2	1390	932	67.1	1085	861	79.4	2965	2,121	71.5	3700	57.3
New York	48,617	26,436	54.4	42,655	24,887	58.3	23,733	15,490	65.3	125,180	73,653	58.8	145,900	50.5
North Dakota	78	53	67.9	21	13	61.9	161	99	61.5	283	180	63.6	—	
Oregon	407	230	56.5	751	465	61.9	4533	2783	61.4	6,025	3664	60.8	7300	50.2
Rhode Island	510	334	65.5	577	365	63.3	1024	641	62.6	2204	1404	63.7	—	
South Carolina	10,434	6243	59.8	686	342	49.9	3648	2489	68.2	15,158	9327	61.5	19,100	48.8
South Dakota	97	30	30.9	23	6	26.1	251	113	45.0	455	184	40.4	—	
Tennessee	8409	4387	52.2	740	354	47.8	5513	3333	60.5	15,200	8402	55.3	19,000	44.2
Texas	27,219	14,762	54.2	22,830	13,876	60.8	20,364	14,338	70.4	73,962	45,256	61.2	95,600	47.3

Table 1 (continued)

Jurisdiction	Persons living with diagnosed HIV (PLWDH)										Persons living with HIV (PLWH)	
	Black/African American			Hispanic/Latino[a]			White		Total		PLWH[b]	Viral suppression
	PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression	PLWDH	Viral suppression		
	N	N	%	N	N	%	N	N	N	%	N	%
Utah	217	78	35.9	516	210	40.7	1,654	826	2,510	49.9	3000	39.0
Virginia	11,909	3997	33.6	1732	547	31.6	5939	2109	20,458	35.5	25,100	27.9
Washington	1724	1149	66.6	1540	1002	65.1	7136	5,301	11,603	74.3	14,100	59.2
West Virginia	402	150	37.3	88	42	47.7	1124	660	1728	58.7	—	
Wisconsin	2136	1247	58.4	761	452	59.4	2567	1709	5688	66.6	7100	50.1
Wyoming	20	12	60.0	49	25	51.0	173	88	260	50.9	—	
Total	269,344	138,807	51.5	141,929	82,640	58.2	203,582	132,363	653,962	65.0	801,160	47.3

Data are based on address of residence as of December 31, 2014. A viral load test result of < 200 copies/mL on the last test during 2014 indicates HIV viral suppression

— represents numerically unstable estimate

[a]Hispanics/Latinos can be of any race

[b]Includes persons living with undiagnosed or diagnosed HIV

virally suppressed within 12 months of diagnosis and the average time to viral suppression. As of December 2016, 38 jurisdictions had met the following criteria for the collection and reporting of CD4+ T-lymphocyte (CD4) and viral load (VL) test results: (1) the jurisdiction's laws or regulations required the reporting of all CD4 and VL results to the state or local health department; (2) laboratories that perform HIV-related testing for the jurisdiction had reported at least 95% of HIV-related test results to the health department; (3) the jurisdiction had reported to CDC at least 95% of all CD4 and VL test results received since January 2014. The 38 jurisdictions were Alabama, Alaska, California, Colorado, Connecticut, Delaware, the District of Columbia, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Mexico, New York, North Dakota, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

Viral suppression during 2014 was assessed among persons with HIV diagnosed by December 31, 2013 and who were alive as of December 31, 2014. Viral suppression was defined as having a VL result < 200 copies per milliliter at the most recent VL test during 2014. The percentage of all persons living with diagnosed or undiagnosed HIV who are virally suppressed was also calculated using the estimated number of persons living HIV [4]. Viral suppression within 12 months of diagnosis was assessed among persons with HIV diagnosed in 2014 and who were alive for at least 12 months after diagnosis. Time to viral suppression was calculated using Kaplan–Meier survival analysis method with 12 months of observation. All analyses were restricted to persons who were 13 years or older either at diagnosis (time to viral suppression and viral suppression within 12 months of diagnosis) or at year-end 2013 (viral suppression during 2014). Area of residence for the time to viral suppression and viral suppression within 12 months of diagnosis was based on residence at HIV diagnosis; for analysis on viral suppression during 2014 among persons living with HIV, residence was based on most recent known address at the end of 2014. All analyses were stratified by jurisdiction, and viral suppression during 2014 were further stratified by age group, race/ethnicity, and transmission category, so disparities could be evaluated. To account for missing risk factor information, transmission category was adjusted using multiple imputation [5].

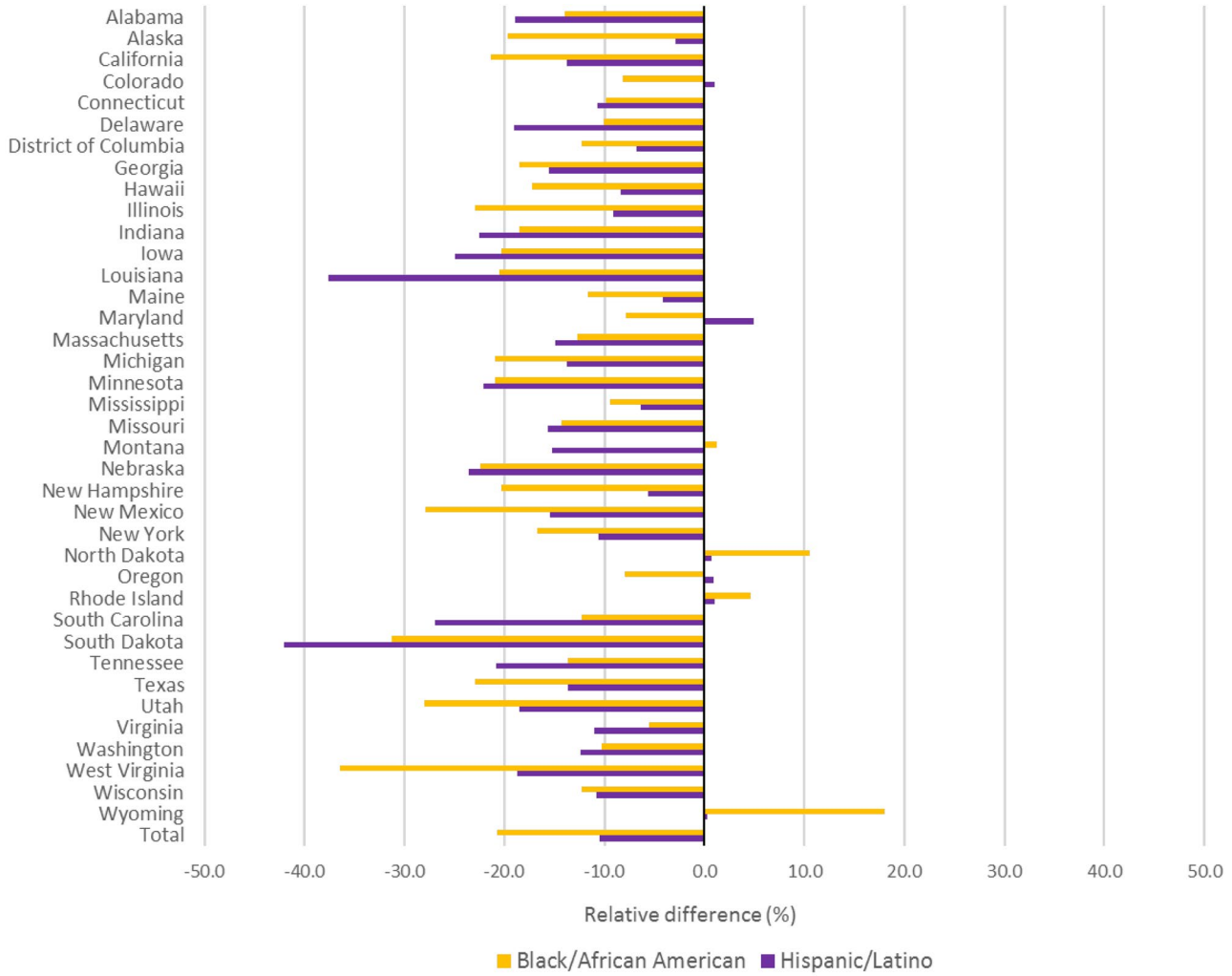
Results

Overall, among PLWDH in 2014 in the 38 jurisdictions, 57.9% were virally suppressed, and, among all persons

living with diagnosed or undiagnosed HIV, viral suppression was 47.3% (Table 1). Viral suppression was higher among whites (65.0%) than blacks (51.5%) or Hispanics/Latinos (58.2%). This disparity persisted in most jurisdictions with a relative difference of 10% or higher in many areas (Fig. 1). In three jurisdictions viral suppression was higher among blacks than whites by at least a relative difference of 5%; Wyoming (relative difference: 18%), North Dakota (relative difference: 11%), and Rhode Island (relative difference: 5%). The areas with the largest disparity between blacks and whites were West Virginia (relative difference: –37%) and South Dakota (relative difference: −31%). In one jurisdiction viral suppression was higher among Hispanics/Latinos than whites (Maryland, relative difference: 5%). The areas with the largest disparity between Hispanics/Latinos and whites were South Dakota (relative difference: −42%) and Louisiana (relative difference: −38%).

In general, viral suppression was higher among older age groups in all regions (Fig. 2), although the age gradient was less pronounced in the Northeast compared to the other regions. The relative difference between the youngest and oldest age groups was 14% in the Northeast compared to approximately 20% in all other regions. The areas with the least variation in viral suppression by age group were Rhode Island, Virginia, and Wisconsin. Two areas had the opposite pattern with the youngest age group having higher viral suppression than the oldest age group; Colorado and North Dakota.

By transmission category, viral suppression was highest among males with infection attributed to male-to-male sexual contact (men who have sex with men, MSM;



Note: The comparison group was white

Fig. 1 Disparity in viral suppression among persons living with diagnosed HIV, by jurisdiction and race/ethnicity, 2014

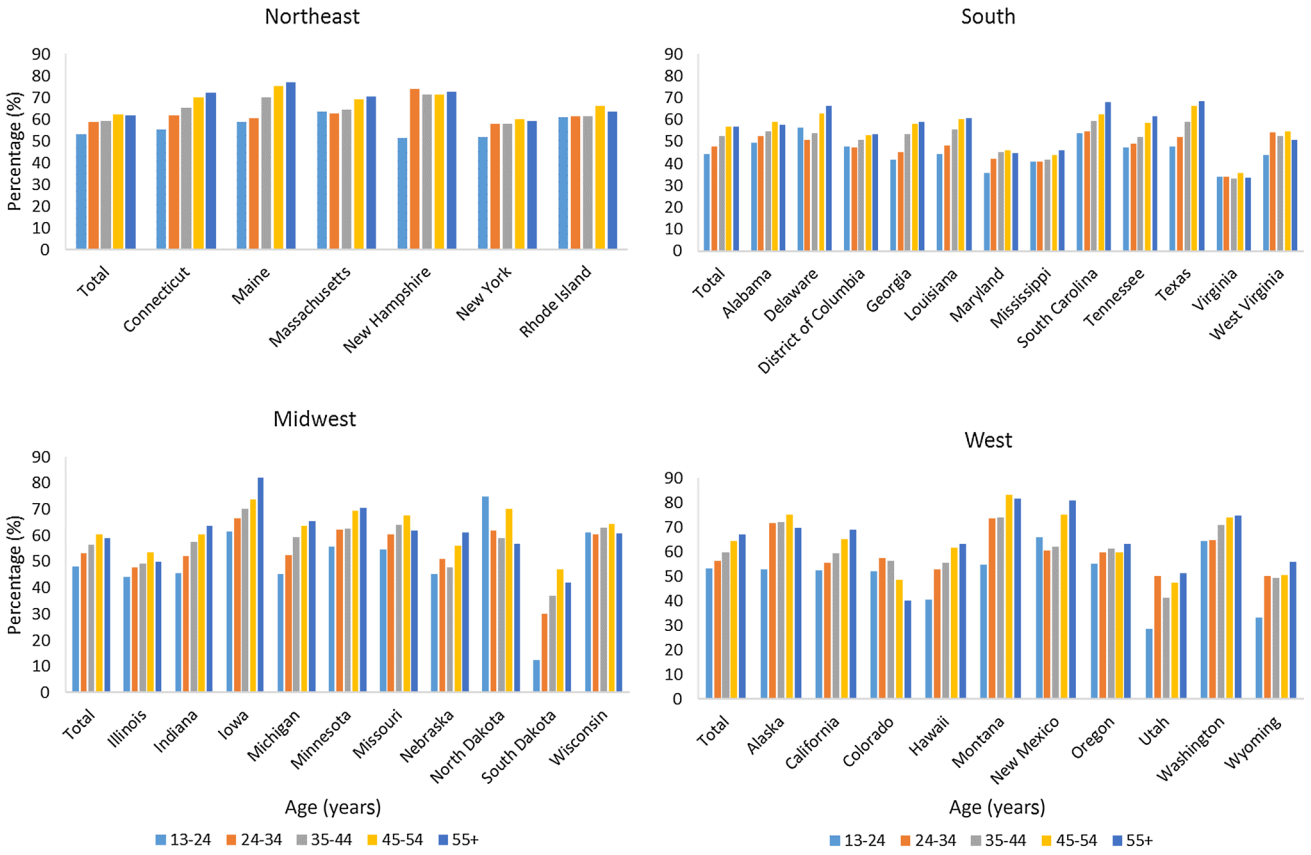


Fig. 2 Viral suppression among persons living with diagnosed HIV, by jurisdiction, region, and age, 2014

61.2%) and lowest among males with infection attributed to injection drug use (IDU; 48.4%; Table 2). The area with the highest viral suppression among MSM was Montana (80.8%) and the lowest was Virginia (34.1%). The area with the highest viral suppression among persons with infection attributed to IDU was Alaska (males: 75.4%, females: 79.7%) and the lowest among male persons who inject drugs (PWID) was Utah (26.5%) and among female PWID was South Dakota (32.8%). The area with the highest viral suppression among persons with infection attributed to male-to-male sexual contact and IDU (MSM/IDU) was North Dakota (86.0%) and the lowest was South Dakota (11.4%). The area with the highest viral suppression among persons with infection attributed to heterosexual contact was Montana (males: 85.2%, females: 79.8%) and the lowest was Virginia (males: 34.3%, females: 34.8%). In most areas, MSM had higher viral suppression than all other transmission categories with a couple notable exceptions (Fig. 3). In Alaska, male and female PWID, MSM/IDU, and females with infection attributed to heterosexual contact all had higher viral suppression than MSM. In North Dakota, female PWID, MSM/IDU, and females with infection attributed to heterosexual contact all had higher viral suppression than MSM. In addition, females with infection attributed to heterosexual contact in Colorado (relative difference: 18%), female PWID in Rhode Island (relative difference: 14%), male PWID in Nebraska (relative difference: 11%), and MSM/IDU in Virginia (relative difference: 17%) all had higher viral suppression than MSM in the respective jurisdictions.

Among persons who received an HIV diagnosis in 2014, 68.2% were virally suppressed within 12 months of diagnosis (Table 3). This varied by jurisdiction from a high of 92.3% in Montana to a low of 59.7% in the District of Columbia. Time to viral suppression was 6.9 months overall with a range of 4.5 months in Montana to 7.8 months in Mississippi and the District of Columbia. Six jurisdictions attained at least 80% viral suppression within 12 months of

Table 2 Viral Suppression among persons living with diagnosed HIV, by Jurisdiction and Transmission Category, 38 U.S. Jurisdictions, 2014

Jurisdiction	Male-to-male sexual contact			Injection drug use—male			Injection drug use—female			MSM/IDU			Heterosexual contact[a]—male			heterosexual contact[a]—female		
	PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression	
	N	N	%	N	N	%	N	N	%	N	N	%	N	N	%	N	N	%
Alabama	6214	3589	57.8	581	274	47.2	519	274	52.9	551	329	59.8	1007	503	49.9	2762	1544	55.9
Alaska	292	200	68.4	48	36	75.4	26	20	79.7	54	42	77.9	44	27	61.7	119	93	77.6
California	81,109	53,174	65.6	5341	2566	48.0	3344	1830	54.7	9402	5683	60.4	3813	2143	56.2	9820	5924	60.3
Colorado	7310	3567	48.8	482	183	37.9	337	170	50.5	1143	511	44.7	392	196	49.9	949	545	57.5
Connecticut	3048	2190	71.8	2121	1376	64.9	1229	820	66.7	309	219	71.0	964	671	69.7	2046	1429	69.8
Delaware	1160	739	63.7	414	248	59.9	259	156	60.2	149	104	69.8	385	221	57.6	676	374	55.3
District of Columbia	7310	3984	54.5	1242	570	45.9	1038	526	50.7	700	395	56.4	1354	620	45.8	2780	1377	49.5
Georgia	25,644	14,415	56.2	2361	1104	46.8	1819	863	47.4	2102	1128	53.7	3244	1631	50.3	9294	4719	50.8
Hawaii	1894	1195	63.1	102	53	52.4	90	38	41.7	210	131	62.5	74	42	56.2	224	98	43.8
Illinois	19,579	10,671	54.5	2614	987	37.8	1769	755	42.7	1998	1059	53.0	1797	798	44.4	4977	2246	45.1
Indiana	5823	3563	61.2	489	240	49.1	326	175	53.8	635	376	59.2	752	411	54.6	1612	853	52.9
Iowa	1313	1005	76.5	125	89	70.8	87	57	64.9	190	137	72.2	147	96	65.6	372	258	69.4
Louisiana	8292	4859	58.6	1329	638	48.0	1056	573	54.3	1097	630	57.4	1567	792	50.5	4155	2295	55.2
Maine	867	657	75.7	99	63	63.1	76	50	65.8	70	49	69.3	67	47	69.3	175	135	77.2
Maryland	10,701	5039	47.1	4070	1519	37.3	2737	1123	41.0	1234	537	43.5	3585	1582	44.1	7708	3660	47.5
Massachusetts	8037	5825	72.5	2803	1737	62.0	1767	1141	64.6	883	629	71.2	1321	836	63.3	3498	2292	65.5
Michigan	8425	5286	62.7	830	405	48.7	731	376	51.4	728	442	60.6	815	455	55.8	2286	1353	59.2
Minnesota	4312	2978	69.1	320	172	53.9	248	149	60.2	444	305	68.7	403	233	57.8	1393	895	64.2
Mississippi	4190	1836	43.8	401	175	43.6	412	156	37.7	385	169	43.8	745	342	45.9	2219	918	41.4
Missouri	7366	4828	65.5	517	243	47.0	322	200	61.9	730	485	66.4	463	248	53.7	1546	991	64.1
Montana	304	245	80.8	36	25	68.0	27	19	71.1	82	62	76.0	23	20	85.2	50	40	79.8
Nebraska	1037	558	53.8	92	55	59.6	66	34	51.1	137	74	53.5	136	63	46.3	368	198	53.9
New Hampshire	644	484	75.2	112	66	59.2	58	36	61.8	65	44	67.5	82	59	72.7	187	136	72.8
New Mexico	1946	1458	74.9	179	94	52.7	95	61	64.1	318	228	71.5	147	88	59.9	253	174	68.8
New York	53,067	33,593	63.3	18,764	8893	47.4	11,152	6140	55.1	5627	3489	62.0	9428	5455	57.9	24,095	14,712	61.1
North Dakota	148	91	61.7	17	6	38.0	7	5	69.2	22	19	86.0	22	13	60.5	61	41	67.4
Oregon	4083	2569	62.9	329	173	52.8	197	106	53.8	639	366	57.2	179	101	56.3	533	321	60.3
Rhode Island	967	615	63.6	268	168	62.9	185	134	72.4	98	64	65.1	237	138	58.0	407	260	63.9
South Carolina	7047	4431	62.9	966	535	55.4	723	405	56.1	641	399	62.2	1767	1063	60.2	3805	2389	62.8
South Dakota	178	79	44.4	39	13	34.1	35	11	32.8	24	3	11.4	64	24	36.8	101	47	46.0
Tennessee	8436	4869	57.7	705	345	48.9	562	290	51.6	604	324	53.6	1321	703	53.2	3370	1785	53.0
Texas	42,822	27,446	64.1	4852	2622	54.0	3314	1866	56.3	4510	2719	60.3	5185	2891	55.8	12,533	7325	58.4

Table 2 (continued)

Jurisdiction	Male-to-male sexual contact			Injection drug use—male			Injection drug use—female			MSM/IDU			Heterosexual contact[a]—male			Heterosexual contact[a]—female		
	PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression		PLWDH	Viral suppression	
	N	N	%	N	N	%	N	N	%	N	N	%	N	N	%	N	N	%
Utah	1491	746	50.1	167	44	26.5	108	40	37.1	356	168	47.2	76	27	35.5	271	128	47.1
Virginia	10,931	3728	34.1	1297	401	30.9	936	323	34.5	904	361	40.0	1702	583	34.3	4348	1512	34.8
Washington	7700	5728	74.4	538	312	58.0	357	234	65.5	1165	798	68.5	476	303	63.7	1212	857	70.7
West Virginia	939	561	59.8	161	67	41.6	114	41	36.4	115	60	52.4	97	46	47.7	270	127	46.9
Wisconsin	3389	2165	63.9	357	187	52.5	260	157	60.2	378	244	64.5	323	182	56.2	891	568	63.7
Wyoming	138	78	56.2	22	10	44.4	14	7	50.4	22	11	51.6	10	6	54.5	47	20	42.5
Total	358,151	219,043	61.2	55,187	26,695	48.4	36,401	19,360	53.2	38,720	22,790	58.9	44,210	23,656	53.5	111,411	62,636	56.2

Data are based on address of residence as of December 31, 2014. A viral load test result of < 200 copies/mL on the last test during 2014 indicates HIV viral suppression. Data have been statistically adjusted for missing transmission category. PLWDH, persons living with diagnosed HIV

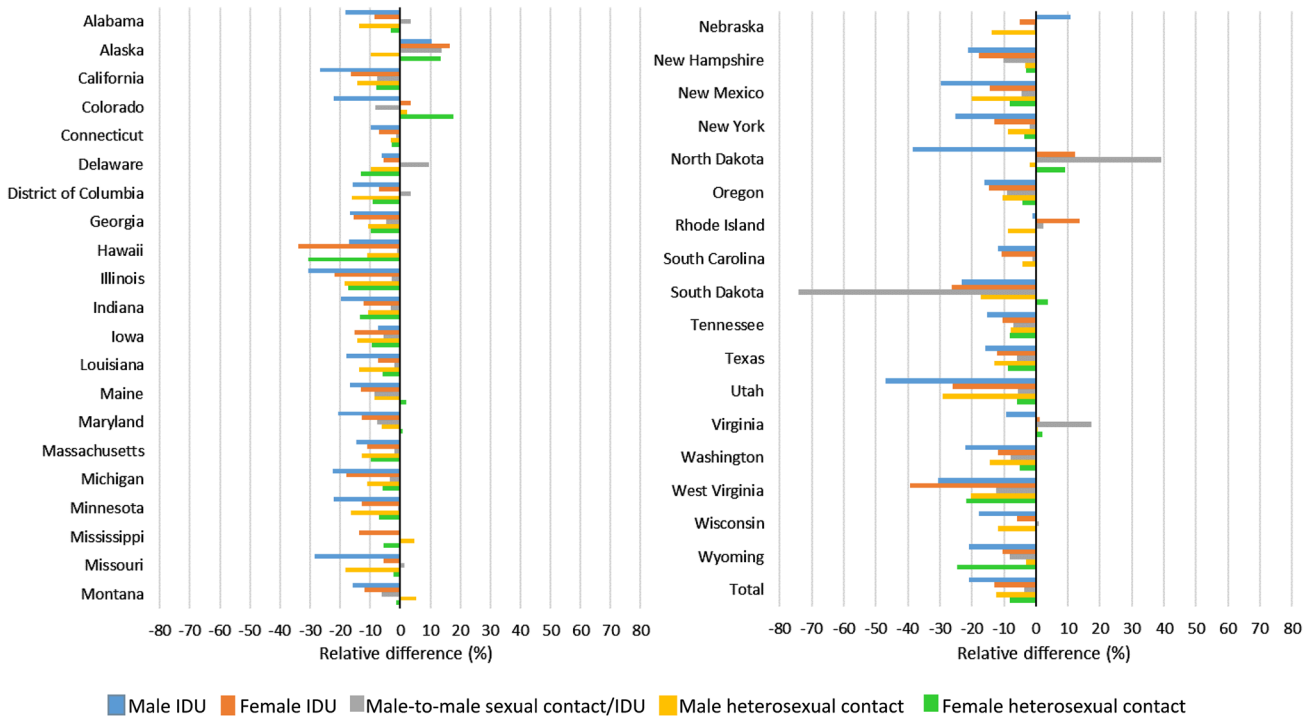
[a]Heterosexual contact with a person known to have, or to be at high risk for, HIV infection

diagnosis with an average time to viral suppression under 6 months; Connecticut, Iowa, Maine, Montana, New Hampshire, and Washington.

Discussion

Overall, in our analysis of viral suppression among PLWDH at year-end 2014 in 38 jurisdictions, none reached the national goal of 80%, but Montana was within 2 percentage points and six others had at least 70% viral suppression. This was an improvement over the 2013 viral suppression rates—only two jurisdictions out of 33 had at least 70% suppression [6]. When examining sub-populations, we found similar patterns of disparity across jurisdictions. In almost all jurisdictions whites had a higher rate of viral suppression then blacks or Hispanics/Latinos. There were only a few exceptions to this pattern and these were mostly in low-morbidity states where small year-to-year changes in numbers may result in large percent changes. The observation that viral suppression increases with age also held true in most jurisdictions. There were only two jurisdictions where viral suppression was higher among younger age groups than older. Further study of the jurisdictions that have high viral suppression among younger age groups may reveal particularly effective strategies that could be shared with other jurisdictions. In general, MSM had higher rates of viral suppression than PWID and those with infections attributed to heterosexual contact. One state with high viral suppression among PWID was Alaska. Determining factors that contributed to this outcome could help other jurisdictions attain similar results.

In addition to having a high level of viral suppression among all PLWDH, it is also important for people with newly diagnosed HIV to be promptly linked to care to attain viral suppression quickly to reduce their window of infectiousness as well as to improve their health outcomes. Among people who received a diagnosis in 2014, 68% were virally suppressed within 12 months. Six jurisdictions had at least 80% viral suppression among persons who received a diagnosis in 2014. These jurisdictions met the national goal for viral suppression among these persons [3] and may serve as models for best practices for attaining a high rate of viral suppression. Four of these jurisdictions also met the national goal of linking 85% of people receiving an HIV diagnosis in 2014 to care within 1 month of diagnosis [6]. Effective interventions that can help improve viral suppression rates include interventions to support linkage and retention in care, such as linkage coordination and case management [7], and treatment adherence through support with mobile applications [8]. Public health departments and care providers can identify people who may be out



Note: *IDU* injection drug use. The comparison group was persons with infection attributed to male-to-male sexual contact

Fig. 3 Disparity in viral suppression among persons living with diagnosed HIV, by jurisdiction and transmission category, 2014

of care and need re-engagement services or who are not virally suppressed and need treatment adherence counseling through surveillance or medical record data [9]. Ensuring all population segments have access to treatment as recommended will require addressing the challenges persons with HIV face with inadequate health insurance, comorbidities, mental health or substance misuse issues, or other social or economic disadvantages such as stigma or lack of transportation [10, 11].

This analysis is subject to at least the following limitations. First, we could only include 38 jurisdictions in the analysis, because complete lab reporting is necessary to accurately measure viral suppression rates. Therefore, the overall results may not be representative of all PLWDH in the United States and we could not evaluate disparities in viral suppression within all 50 states. However, the jurisdictions included in our analyses represent 72% of PLWDH and 71% of persons with HIV diagnosed in 2014 in the United States. Second, area of residence for viral suppression during 2014 among all PLWDH was based on most recent known address as of the end of 2014. If the most recent address in the surveillance data did not accurately reflect where an individual was living at the time, then they may be classified into the wrong jurisdiction.

These data highlight the need for tailored interventions at the local level. There are wide variations in the rate of viral suppression across jurisdictions as well as variations in disparity profiles, which suggests a one-size-fits-all approach will not be effective. However, there are opportunities for jurisdictions to learn from each other. Those jurisdictions who have relatively low viral suppression among particular groups could adapt effective interventions from similar jurisdictions with higher rates of viral suppression. Health care providers, state and local health departments, and

Table 3 Percentage with viral suppression at 12 months after diagnosis, and time to viral suppression, among persons with HIV diagnosed in 2014, 38 U.S. Jurisdictions

Jurisdiction	Diagnosis		Viral suppression within 12 month of diagnosis	Time to viral suppression
	N	Col %	%	Months (SE)
Alabama	670	2.4	70.5	6.9 (0.16)
Alaska	39	0.1	69.2	5.4 (0.43)
California	5061	17.8	67.6	6.9 (0.06)
Colorado	377	1.3	77.8	6.5 (0.20)
Connecticut	290	1.0	81.6	5.4 (0.24)
Delaware	115	0.4	68.8	6.4 (0.41)
District of Columbia	411	1.5	59.7	7.8 (0.21)
Georgia	2340	8.2	63.2	7.3 (0.09)
Hawaii	99	0.4	75.8	6.0 (0.42)
Illinois	1527	5.4	61.6	7.3 (0.11)
Indiana	461	1.6	64.2	7.5 (0.19)
Iowa	94	0.3	86.5	5.0 (0.34)
Louisiana	1214	4.3	65.5	7.4 (0.12)
Maine	55	0.2	87.3	4.7 (0.54)
Maryland	1272	4.5	61.3	7.4 (0.13)
Massachusetts	659	2.3	79.9	5.0 (0.17)
Michigan	780	2.7	68.6	7.1 (0.15)
Minnesota	303	1.1	72.5	6.0 (0.25)
Mississippi	481	1.7	61.4	7.8 (0.19)
Missouri	467	1.6	74.1	6.5 (0.19)
Montana	14	0.1	92.3	4.5 (0.67)
Nebraska	88	0.3	72.6	6.0 (0.41)
New Hampshire	41	0.1	85.4	5.4 (0.58)
New Mexico	135	0.5	74.8	6.3 (0.36)
New York	3368	11.9	74.8	6.1 (0.07)
North Dakota	20	0.1	65.0	7.2 (1.08)
Oregon	242	0.9	71.2	6.8 (0.26)
Rhode Island	96	0.3	79.0	5.6 (0.43)
South Carolina	757	2.7	73.1	7.0 (0.15)
South Dakota	28	0.1	64.3	6.1 (0.76)
Tennessee	747	2.6	63.6	7.6 (0.15)
Texas	4399	15.5	66.2	7.2 (0.06)
Utah	113	0.4	76.8	6.4 (0.39)
Virginia	912	3.2	61.6	7.5 (0.14)
Washington	437	1.5	80.4	5.2 (0.20)
West Virginia	89	0.3	77.1	6.5 (0.45)
Wisconsin	219	0.8	78.6	5.7 (0.28)
Wyoming	10	0.0	70.0	7.4 (1.26)
Total	28,430	100	68.2	6.9 (0.03)

Diagnosis exclude those where month of diagnosis or death is missing, or if death occurred before diagnosis

community-based organizations can collaborate to develop effective interventions and the services and infrastructure needed to promote engagement in care and adherence to medication, which can lead to the desired outcome of viral suppression [12].

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Cohen, M. S., Chen, Y. Q., McCauley, M., et al. (2011). Prevention of HIV-1 infection with early antiretroviral therapy. *The New England Journal of Medicine, 365*(6), 493–505.
2. Lingappa, J. R., Hughes, J. P., Wang, R. S., et al. (2010). Estimating the impact of plasma HIV-1 RNA reductions on heterosexual HIV-1 transmission risk. *PLoS ONE, 5*(9), e12598.
3. National HIV/AIDS strategy for the United States: Updated to 2020 July 2015 [May 19, 2017]. Available from: https://www.hiv.gov/sites/default/files/nhas-update.pdf.
4. CDC. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas, 2015. HIV Surveillance Supplemental Report [Internet], 2017, *22*(2). Available from: http://www.cdc.gov/hiv/library/reports/surveillance.
5. Harrison, K. M., Kajese, T., Hall, H. I., & Song, R. (2008). Risk factor redistribution of the national HIV/AIDS surveillance data: An alternative approach. *Public Health Reports (Washington, D. C.: 1974), 123*(5), 618–627.
6. CDC. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data - United States and 6 dependent areas, 2014. HIV Surveillance Supplemental Report [Internet], [May 19, 2016], 2017; *21*(4). Available from: http://www.cdc.gov/hiv/library/reports/surveillance.
7. CDC. Anti-retroviral treatment and access to servies (ARTAS) [June 8, 2017]. Available from: https://effectiveinterventions.cdc.gov/en/HighImpactPrevention/PublicHealthStrategies/ARTAS.aspx.
8. CDC. Every dose every day [June 8, 2017]. Available from: https://effectiveinterventions.cdc.gov/en/HighImpactPrevention/BiomedicalInterventions/MedicationAdherence.aspx.
9. CDC. Data to Care: Improving health and prevention [June 8, 2017]. Available from: https://effectiveinterventions.cdc.gov/en/HighImpactPrevention/PublicHealthStrategies/DatatoCare.aspx.
10. Department of Health and Human Services. Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents. [June 9, 2017]. Available from: http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf.
11. Colasanti, J., Stahl, N., Farber, E. W., Del Rio, C., & Armstrong, W. S. (2017). An exploratory study to assess individual and structural level barriers associated with poor retention and re-engagement in care among persons living with HIV/AIDS. *Journal of Acquired Immune Deficiency Syndromes (1999), 74*(Suppl 2), S113–S120.
12. Aberg, J. A., Gallant, J. E., Ghanem, K. G., et al. (2014). Primary care guidelines for the management of persons infected with HIV: 2013 update by the HIV Medicine Association of the Infectious Diseases Society of America. *Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America, 58*(1), 1–10.